FACTORS ASSOCIATED WITH NEWLY DIAGNOSED HIV-POSITIVE AMONG ANTENATAL MOTHERS IN PREVENTION OF MOTHER TO CHILD TRANSMISSION (PMTCT) PROGRAM IN KELANTAN

DR. MOHD KHAIRUL ANWAR BIN KAMDI

UNIVERSITI SAINS MALAYSIA

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By

DR. MOHD KHAIRUL ANWAR BIN KAMDI

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LIST OF SYMBOLS

>	More than
<	Less than
=	Equal to
≥	More than and equal to
≤	Less than and equal to
α	Alpha
β	Beta
%	Percentage
Δ	Precision / Delta

LIST OF ABBREVIATIONS

AIDS	Autoimmune Deficiency Syndrome
ARV	Anti-Retroviral
HAART	Highly active antiretroviral therapy
HIV	Human Immunodeficiency Virus
IBBS	Integrated Bio-Behavioural Survey
MCH	Maternal Child Health
MREC	Medical Research Ethics Committee
MOH	Ministry of Health
NMRR	National Medical Research Registry
PITC	Provide initiated testing and counselling
PMTCT	Prevention of Mother to Child Transmission
PLHIV	People living with HIV
PWID	People who injects drugs
STI	Sexually Transmitted Infection
TB	Tuberculosis
VCT	Voluntary and Counselling Testing
WHO	World Health Organization
ZDV	Zidovudine

ABSTRAK

FAKTOR-FAKTOR BERKAITAN YANG MENJURUS KE DIAGNOSA BARU HIV DI KALANGAN IBU MENGANDUNG YANG POSITIF HIV DI KELANTAN

Latar Belakang: Penularan vertikal adalah cara penularan HIV yang biasa pada kanak-kanak, 30% hingga 45% akan dijangkiti HIV dari ibu semasa kehamilan, proses kelahiran atau menyusu bayi. Malaysia memulakan program pencegahan penularan HIV daripada ibu kepada anak peringkat kebangsaan pada tahun 1998. Ia merangkumi empat strategi: a) pencegahan utama HIV untuk penularan HIV daripada ibu kepada anak; b) mencegah kehamilan yang tidak diingini di kalangan ibu positif HIV; c) mencegah penularan vertikal HIV daripada ibu ke bayi mereka; dan d) memberi rawatan dan sokongan kepada ibu-ibu yang positif HIV dan anak-anak mereka. Dalam strategi ini, cara kelahiran bayi yang selamat biasanya dilakukan dengan pembedahan caesarean dan penggantian susu kepada bayi yang dilahirkan oleh ibu-ibu positif HIV akan dibekalkan oleh KKM sehingga bayi berumur 24 bulan.

Objektif: Kajian ini dilakukan bertujuan untuk mengenalpasti kadar dan faktor-faktor yang berkaitan dengan sosiodemografi, sejarah obstetrik dan risiko ibu dan suami dengan ibu-ibu mengandung yang baru didiagnosa positif HIV dalam program pencegahan penularan HIV daripada ibu kepada anak di Kelantan dari tahun 2009-2017.

Metodologi: Kajian ini menggunakan kaedah hirisan lintang berdasarkan rekod retrospektif pendaftaran program pencegahan penularan HIV daripada ibu kepada anak di Kelantan dari

tahun 2009 hingga 2017 menggunakan data sekunder yang diperolehi daripada Unit HIV / STI / Hep C, Bahagian Kawalan Penyakit, Jabatan Kesihatan Negeri Kelantan. Kajian ini dijalankan dari Januari hingga April 2018. Kesemua 228 kes dianalisa dengan menggunakan model regresi logistik untuk mengenalpasti faktor-faktor yang berkaitan dengan HIV yang baru didiagnosa di kalangan ibu mengandung di Kelantan.

Keputusan: Daripada 228 kes yang dilaporkan positif HIV di kalangan ibu mengandung, 123 (53.9%) adalah kes yang baru didiagnosa manakala 105 (46.1%) adalah kes lama. Dalam kajian ini terdapat kaitan yang ketara dengan multigravida ($p < 0.001$), multipariti ($\chi 2$ (df), 13.868 (2), $p<0.001$) dan risiko tingkah laku suami ($\chi 2$ (df); 6.215 $P = 0.045$) dengan status kes HIV. Faktor yang berkait rapat dengan kes HIV yang baru didiagnosa dalam kalangan ibu mengandung adalah multigravida (AOR 0.142, 95% CI = 0.052, 0.384; $p <0.001$) dan tingkah laku suami tidak diketahui (AOR 0.359, 95% CI = 0.16, 0.804; $p = 0.013$).

Kesimpulan: Kajian ini menunjukkan faktor-faktor penting yang berkaitan dengan HIV-positif di kalangan ibu mengandung yang baru didiagnosis di Kelantan adalah faktor risiko gravida dan suami. Hasil keputusan ini mencadangkan untuk meningkatkan pendidikan dan promosi kesihatan yang komprehensif dan strategik tentang jangkitan HIV di kalangan penduduk di Malaysia khususnya di Kelantan, sambil mengukuhkan program PMTCT HIV dengan sewajarnya.

KATA KUNCI: HIV, ibu mengandung, diagnosa baru, PMTCT, faktor berkaitan

ABSTRACT

FACTORS ASSOCIATED WITH NEWLY DIAGNOSED HIV-POSITIVE AMONG ANTENATAL MOTHERS IN PREVENTION OF MOTHER TO CHILD TRANSMISSION (PMTCT) PROGRAM IN KELANTAN

Background: Vertical transmission is common and important mode of HIV transmission in children and without intervention, 30% to 45% will be infected with HIV from the mother during pregnancy, the delivery of the baby or breast feeding. Malaysia embarked on national PMTCT Program in 1998. It covers four strategies: a) primary prevention of HIV for PMTCT; b) preventing unintended pregnancies among HIV-positive women; c) preventing vertical transmission or HIV transmission from women to their infants; and d) providing care, treatment and support for mothers with HIV and their children. Safer modes of delivery which usually caesarean section are applied in these strategies and replacement feeding to baby born from HIV positive mothers will be supplied by MOH until the baby is 24 months old.

Objective: This study aims to describe and determine associations of sociodemographic, obstetric history and risks of mothers and husband with newly diagnosed HIV-positive antenatal mothers in PMTCT program in Kelantan from 2009-2017.

Methodology: This study applied cross sectional design based on retrospective records review of PMTCT registry in Kelantan from 2009 to 2017 using secondary data obtained from HIV / STI / Hep C Unit, Disease Control Division, Kelantan State Health Department.

The study was conducted from January until April 2018. All 228 cases were analyzed using multiple logistic regression to identify factors associated with newly diagnosed HIV-positive among antenatal mothers in Kelantan.

Result: Out of 228 cases that were notified for HIV-positive among antenatal mothers, 123 (53.9%) cases were newly diagnosed while 105 (46.1%) were old cases. In this study, there is a significant association with multigravida ($p<0.001$), multiparity (χ^2 (df); 13.868 (2), $p<0.001$) and husband's risk behaviour (χ^2 (df); 6.215 (2), $P=0.045$) with HIV case status. The significant associated factors to newly diagnosed HIV-positive among antenatal mothers are multigravida (AOR 0.142, 95% CI=0.052, 0.384; $p<0.001$) and husband's unknown behaviour (AOR 0.359, 95% CI=0.16, 0.804; $p=0.013$).

Conclusion: This study reveals the significant factors associated with HIV-positive among newly diagnosed antenatal mothers in Kelantan were gravida and husband's risk behaviour. These data suggested a comprehensive and strategic health education and promotion regarding HIV infection among the population in Malaysia especially in Kelantan, while strengthen the PMTCT program of HIV accordingly.

KEY WORDS: HIV, antenatal mothers, PMTCT, factors associated, newly diagnosed and pregnant women.

CHAPTER 1

INTRODUCTION

1.1 Background

For many decades, Malaysia has implemented a comprehensive package for antenatal mothers seeking antenatal care (MOH, 2000). The evolution of this comprehensive package started by the maternal and child health (MCH) activities of primary care clinics which started in the 20th century (during the British colonial era) right up to present times. It has been recognised by our government and Ministry of Health (MOH) that the MCH services should always remain as one of the main pillars of primary care in this country.

Malaysia has been implementing the vertical transmission program of syphilis for more than two decades (MOH, 2000). Syphilis was introduced as part of the package more than 30 years ago followed by HIV a decade later. MOH Malaysia has been one of the early implementers of PMTCT programme of HIV in this region, incepted countrywide as a national program in 1998 (MOH, 2016). The PMTCT Program in Malaysia is based around antiretroviral (ARV) prophylaxis for both mother and baby, the practices of modes of delivery and feeding of infant that are much safer and the detection of HIV infection during pregnancy period. The strategies rely on early antenatal follow-up and status of HIV, the time started taking ARV prophylaxis and early follow-up of the baby. In the program the prevention of HIV in women,

community-based care and the support of families living with PLHIV are strongly integrated.

There has been constant revisions of the HIV PMTCT program, and after years of implementation, the current PMTCT program is evenly matched with established standards programs elsewhere around the world. Though there are challenges, the program has provided services to all population groups of this country without discrimination.

Although Malaysia does not have a national health insurance scheme that offer coverage for all population groups, all health care services are provided free for Malaysians. Private health insurance schemes are also offered to private employees, whilst the health benefits for the government employees are covered by the state. PMTCT of HIV like most infectious diseases is heavily subsidised by the government. The first line treatment regimen for HIV is provided free by the government like most other infectious diseases (MOH, 2000).

All antenatal mothers are expected to have an average of 8 visitations during pregnancy, out of which at least one visit managed by a qualified medical practitioner. As part of the comprehensive antenatal package, expectant mothers will be screened for syphilis, HIV, haemoglobin analysis, urine analysis and blood group analysis. Hepatitis B vaccination among antenatal mothers have also been initiated in the state of Sabah (MOH, 2000).

1.1.1 Implementation of PMTCT of HIV

The first case of HIV was reported in Malaysia in 1986. Over the years, aggressive screening programs and responses were becoming routine resulting in the significant rise in the detection of HIV/AIDS cases. Among HIV responses include inmates screening in drug rehabilitation centres and prisons, voluntary screening, anonymous screening, harm reduction programs, screening of TB, Hepatitis and STI patients, screening among PLHIV contacts, premarital and antenatal mothers. Surveillance records from the Ministry of Health show that the first antenatal case of HIV-positive Malaysian was recorded in 2000.

Vertical transmission is common and important mode of HIV transmission in children and without intervention, 30% to 45% of children will be infected with HIV from the mother during pregnancy, the delivery of the baby or breast feeding. Supported by adequate evidence globally, Malaysia embarked on national PMTCT Program in 1998. It covers four strategies: a) an early detection of HIV infection using a rapid test; b) counselling session for infected couples; c) starting of oral Zidovudine (ZDV) to infected mothers as stated in the protocol of Paediatric AIDS Clinical Trials Group 0764 (PACTG-0764), i.e. early in the second trimester of pregnancy until labour, then switching to intravenous ZDV during labour, and oral ZDV will be given to the baby for 6 weeks of life; and d) the screening test among babies born to HIV infected mothers. Safer modes of delivery which usually caesarean section are applied in these strategies and replacement feeding to baby

born from HIV positive mothers will be supplied by MOH until the baby is 6 months old and then was extended to 24 months (MOH, 2012).

With the advancement of highly active antiretroviral therapy, and in accordance with WHO guidelines, ARV regimen was upgraded to option B in 2008 and eventually to option B+ in 2011. Antenatal mothers who present in labour with no antenatal follow-up or HIV testing are also provided. The HIV rapid test screening is done at the bed side and mothers that are found to be HIV reactive in labour are managed accordingly to the post-natal component of PACTG-0764 protocol.

To ensure comprehensive care, all HIV-positive mothers and their exposed infants are referred to a "combined care" made up of Infectious Disease Physicians (ID Physicians), Obstetrics & Gynaecologists (O&G Specialists), Paediatricians and Family Medicine Specialists (FMS). The objective of this joint care is to ensure healthy and HIV-free babies and long-term follow-ups for mothers, their spouses and infants. Wherever and whenever needed, appropriate referrals could be done.

1.1.2 HIV prevalence among antenatal mothers

The HIV prevalence as reported has stabilised at 0.06 - 0.07% (Figure 1.1**)** (MOH, 2016). However, some states were observed having increasing prevalence among antenatal mothers (e.g. in the states of Kelantan, Pulau Pinang, Melaka, Sabah and Sarawak) with Kelantan recorded the highest rate at 0.13% in 2016 above the national rate (Figure 1.2).

Various sources of data were triangulated to make up for the possible missing antenatal care among PLHIV especially among the key populations (i.e PWID and female sex workers) and teenage mothers. Estimated number of PLHIV antenatal that may not had antenatal care was added into the total PLHIV antenatal reported to calculate the adjusted HIV prevalence and ART coverage.

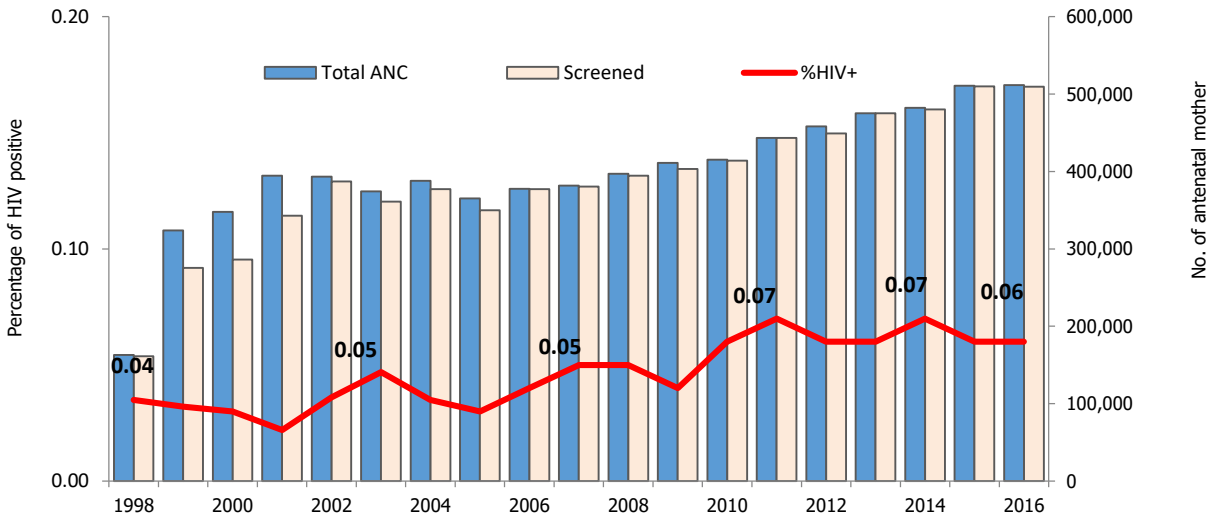

Figure 1.1: HIV screening and sero-positive rate among antenatal mothers in Malaysia: 1998-2016 (Source: HIV/STI/Hep C Sector, MOH Malaysia, 2016)

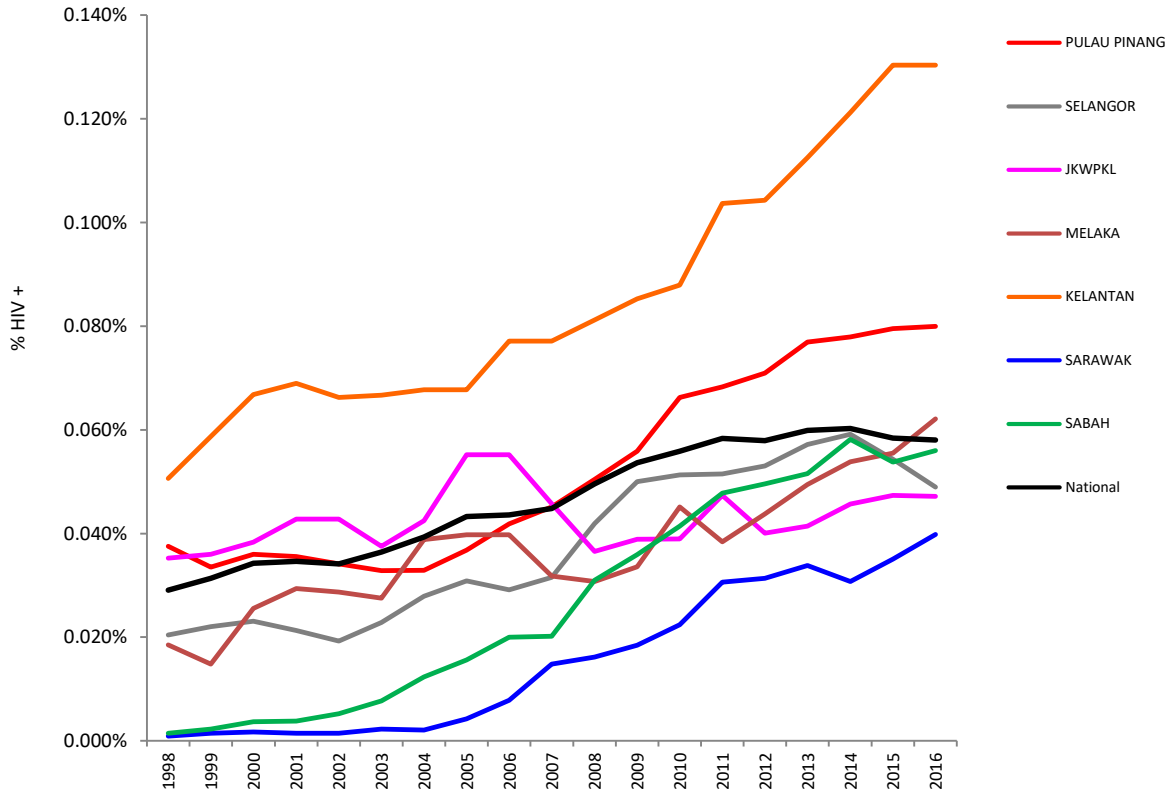

Figure 1.2: Seven-year moving average of HIV seropositive rate among ANC mothers in selected states in Malaysia, 1998-2016 (Source: HIV/STI/Hep C Sector, MOH Malaysia, 2016)

1.1.3 Newly diagnosed HIV-positive among antenatal mothers

Even though there are many studies have been conducted that addressed issues and factors related to HIV-positivity among women and antenatal mothers, to the best of my knowledge, there is no research or similar study either local or abroad regarding factors associated with newly diagnosed HIV-positive mothers within the PMTCT program. It is important for us to diagnose as early as possible antenatal mothers who are HIV-positive and detecting such new cases among antenatal mothers may reflect how effective the PMTCT program in detecting and subsequently provide appropriate measures of intervention in both reducing the transmission of HIV to the new-born but also providing necessary support, services and family planning options to the mothers as well.

As for old cases of HIV-positive antenatal mothers that subsequently becomes pregnant again and detected through the PMTCT program, this may indicate that the preventive measures as stipulated in the PMTCT program in reducing unwanted pregnancy among HIV-positive mothers are not achieving the target.

1.2 Problem Statement

1. Vertical transmission is one of the major modes of transmission of HIV among children globally and it contributes to about 20% of all HIV infections and more than 90% of worldwide HIV infections in pediatrics (HIV/AIDS, 2016).

2. Late detection of HIV-positive in pregnancy can lead to increase risk in vertical transmission from mother to child and this also may indicate weakness in prevention prong of reducing unwanted pregnancy among women with HIV infection.

3. In Malaysia, the PMTCT program which started in 1998 is one of the important HIV screening strategies especially among the women at reproductive age groups and the program still need to be strengthened as there are still cases detected among newborns.

4. Detecting new HIV infections among the mothers may reflect lack of success in preventing unwanted pregnancy among HIV-positive women if they are newly detected within the PMTCT program while limited information regarding risk factors toward new HIV infection among women or mothers is also a concern.

1.3 Significance of Study

1. HIV is still a major of medical and public health problems in the world including Malaysia and identifying the factors associated of HIV-positive among antenatal mothers can help to guide HIV prevention and strengthen HIV reduction program in Kelantan.

2. Thus, this study can also help in seeing the gap regarding HIV prevention program in Malaysia and specifically in Kelantan as for us health provider, we need to look back to our prevention program especially on counselling HIV-positive couples regarding family planning and strengthen it so that HIV-positive mothers can prevent themselves from getting pregnant so that vertical transmission to the new-born can be prevented

1.4 Research Question

1. What are the characteristics of newly diagnosed HIV-positive among antenatal mothers in Kelantan?
2. What are the risk factor for newly diagnosed HIV-positive among antenatal mothers in Kelantan?

1.5 Objectives

1.5.1 General Objective

To study the associated factors with newly diagnosed HIV-positive antenatal mothers in Prevention of Mother-to-Child Transmission (PMTCT) program in Kelantan.

1.5.2 Specific Objective

1 To describe sociodemographic characteristics, obstetric history and husband's and mother's risk behaviour of HIV-positive antenatal mothers in PMTCT program in Kelantan from 2009-2017.

2 To determine associations between sociodemographic, obstetric history, husband's and mother's risk behaviour with newly diagnosed HIV among HIV-positive antenatal mothers in PMTCT program in Kelantan.

1.6 Hypothesis

There are associations between sociodemographic, obstetric history and risk of mothers and husband behaviour with newly diagnosed HIV-positive among antenatal mothers in PMTCT program in Kelantan.

CHAPTER 2

LITERATURE REVIEW

Search of papers in this study was done using online search engine and database that include PubMed, Scopus, Web ISI, Google Scholar, Springer link and Science Direct. Several searching strategies was applied including the use of Boolean operators, “AND”, “OR” and “NOT”. The key words used were HIV, antenatal mothers, PMTCT, factors associated, newly diagnosed and pregnant women.

2.1 Sociodemographic characteristics of HIV-positive mothers

2.1.1 Age

Age of antenatal mothers play a part in the transmission of HIV. A study done in Nepal by Rijal *et al.* (2014) mentioned that the highest of HIV infected mothers was among the 35-39 years age group, followed by 15-19 years, while a study done by Businge *et al.* (2016) showed that antenatal mothers age 25 years and above had a higher risk of HIV infection and are similar to the findings done by Ezat *et al.* (2012) at Sabah, Malaysia. Other study that shared the same findings was done by Fouedjio *et al.* (2017) in Cameroon mentioned that at this age the they are sexually active and prone to get HIV infection.

Otherwise, Alarcon *et al.* (2003) done a study at Peru stated that sexual debut at 18 years old or younger are associated in getting HIV infection. Another study said that

the husband’s age play a significant role in indicating the pregnancy although the mother know that she had HIV infection (Bah'him *et al.*, 2010). They tend to have sex with older man that had been exposed to HIV in many years (Sagay *et al.*, 2005).

Young women age between 15 to 19 years old were easily to get infected with HIV in view of gender inequalities, sexual violence and early marriage (Miranda *et al.*, 2014). A study mentioned that at older age the prevalence at antenatal clinics are low. This is because HIV infection causing infertility because of the decreasing in sexual activity at older age (Johnson and Budlender, 2002).

The age of diagnosis influenced the rate of pregnancies. A study mentioned that the younger the age of diagnosis of HIV, the higher occurrence of pregnancies. The study suggest that pregnant after diagnosed of HIV is the result in context of vulnerability which women with HIV-positive live (Teixeira *et al.*, 2017).

2.1.2 Ethnicity

Malaysia is a multi-racial country consisting of Malays, Chinese, Indians and numerous indigenous people. The Malays, make up Malaysia's largest ethnic group, which is more than 50% of the population. In Malaysia, the term Malay refers to a person who practices Islam and Malay traditions and speaks the Malay language. As for Kelantan, more than 95% are malays and others are Chinese, Indians and indigenous people. In 2002 ministry of health Malaysia reported that among all HIV

cases detected in Malaysia, majority are Malays, followed by Chinese and Indians (MOH, 2002).

This report was supported by a study done in Terengganu that showed Malays contribute more than 95% of HIV infection in Terengganu as Malays are the majority ethnic there (Balkis, 2003). Ethnicity has been said to be the strongest correlation of knowledge to HIV infection and self-stigma (Koh, 2014).

2.1.3 Religion

In Malaysia, Islam is the main religion. All of the Malay in Malaysia are Muslim. Other religion in Malaysia besides Islam are Christians, Buddhism and Hindu. Many cases claimed that religion influenced them to get pregnant even knowing their HIV-positive status. A study done in South Africa that the majority of the population were Christians mentioned that church members are less likely to engage in premarital sex and less likely to get HIV infection as compared to non-members of the church (Johnson and Budlender, 2002). We can assume that if one person are loyal or a religious person less likely to involve with HIV transmission compared to non-religious person (Johnson and Budlender, 2002).

2.1.4 Occupation

Most of the literature mentioned that majority of antenatal mothers who are HIV-positive are unemployed or basically a housewife. Their income mostly depends on

their husbands who are working (Bah'him *et al.*, 2010). A study has stated that antenatal mothers with low income are vulnerable to get HIV and mostly were housewives (Fouedjio *et al.*, 2017).

Housewives compared to other working women are less educated and lack of awareness regarding HIV transmission and usually doing unhealthy sexual activities with their husbands that can lead to HIV infection (Rijal *et al.*, 2014). The relationship between unemployment rates and antenatal clinic prevalence are difference in solid population and less dense population. It shows that if in less dense population, which unemployment are high probability of HIV infection are also high (Johnson and Budlender, 2002).

2.2 Obstetric history

2.2.1 Gravida

Pakistan that has the second most Muslim country in the world has been experience in HIV epidemic as reported by Mahmud and Abbas (2009) in his study done in 2009. Out of 5263 total antenatal care attendances, 14% women has notified to be in high risk behaviour. The mean age was 27 years old with primigravida 32% and multigravida were 68% (Mahmud and Abbas, 2009).

A study done in Botswana showed that HIV infection among antenatal women had more than two pregnancies and the majority knew their HIV status more than 1 year before getting pregnant (Bah'him *et al.*, 2010).

A research in Terengganu, stated that multigravida was the highest of risk factor among antenatal mothers who were HIV-positive (Balkis, 2003).

2.2.2 Parity

Bah'him *et al.* (2010) mentioned in his study that 74% of antenatal mothers in Botswana who was HIV-positive was multiparity and the remaining was primiparity.

A recent study was done in British Columbia mentioned that the majority of HIV-positive among antenatal mothers there were multiparity mothers. During antenatal visits, multiparity mothers noted to had 54% higher odds of unknown antenatal HIV infection compared to primiparity mothers. The current situation of deliveries in 2011, multiparity was related with unknown HIV status. This situation did not change between 2005 and 2011 and unlikely to change the establish of HIV infection status in multiparity to nulliparity women (Slogrove *et al.*, 2018). A study done in Burkina Faso in 2017 revealed that HIV seroprevalence are related to parity and noted that nulliparity are higher than multiparity (Konaté *et al.*, 2017).

2.3 Mothers risk behavior

2.3.1 People who injecting drug (PWID)

Injecting drug use has been the major factor for the country's epidemic. A study done in Saints Petersburg, Russia in 2015 showed that pregnancy are not related to PWID and for HIV-positive women the relation was stronger (Girchenko *et al.*, 2015).

Active drug use for HIV-positive women was not related to having prior children. They intend to motivate themselves to stop injecting drugs when pregnant but limited at time of pregnancy.

These finding shows that interventions should be done to prevent spreading of HIV and preventing unplanned pregnancies in the population of women who inject drugs. The study also mentioned that prevalence of PWID among women did show the prevalence among the total population of PWID in Russia.

The high level of HIV prevalence among PWID in pregnant women in the study, makes the highest number of deliveries in Russia by HIV-positive mothers (Girchenko *et al.*, 2015).

A study mentioned that females who inject drugs (FWID) are scarce, but a recently published meta-analysis of 135 studies with data collected between 1982 and 2009, all over 125,000 PWID from four continents (excluding Africa and Oceania) had an overall proportion of 21.5% women, which correspond to approximately 3.5 million FWID globally (Azim *et al.*, 2015). A similar review from Central Asia, on data collected between 2002 and 2012, showed that FWID in Russia, Kazakhstan, Uzbekistan and Tajikistan also had higher HIV prevalence; 10.1% compared to 9.5% among men who inject drugs (Azim *et al.*, 2015).

2.3.2 Heterosexual risk behaviour

Countries have shown that the majority of HIV transmission are from sexual activities. These countries have stated that unprotected sexual activities with unknown status of partner was the main culprit of HIV infection in the world. Hawken *et al.* (1995) mentioned in her study that almost quarter of HIV infection in United Kingdom were from heterosexual transmission.

A study regarding sexual HIV risk behaviour and associated factors among pregnant women in Mpumalanga, South Africa was done in 2013 indicated that among antenatal mothers with HIV, heterosexual risk behaviour was significant, including unprotected sex, multiple partners and sexual partners of unknown serostatus. Antenatal care attendance are very important to promote condom use for heterosexual activities to prevent from unwanted pregnancies. Educational factors such as non-antenatal care attendance by husband and being HIV positive were found to be related with having a partner with HIV positive or unknown status. Having unprotected sex with partners of HIV positive or unknown HIV status includes an increased HIV risk and should be avoided (Peltzer and Mlambo, 2013).

In 2014, sex worker population size in Malaysia is about 45,000, out which 21,000 are female sex workers. We were not sure whether the antenatal women that was HIV-positive are really housewife or doing other job like sex worker to get income for their family. In Ministry Of Health surveillance system, the HIV infections are

categorized by risk factor, heterosexual, homosexual or bisexual (Disease Control Division, 2015).

Another study done in Terengganu in 2003 showed that almost all antenatal mothers who was HIV-positive are from heterosexual activities with partner. Similar studies done in Negeri Sembilan and Perak where more than 90% was from husband (Balkis, 2003). In 2014, a review of HIV research in Malaysia has mentioned that almost all antenatal mothers with HIV-positive in Malaysia was because of unhealthy heterosexual activities with their partners (Koh, 2014).

2.4 Husband's risk behaviour

2.4.1 People who inject drugs (PWID)

Although Malaysia is not a major producer of drugs, because Malaysia's located near to the Golden Triangle and other Southeast Asia countries that produce the illicit drugs has resulted in drug use problem in the country (Kamarulzaman, 2009).

PWID previously was the main factors for HIV infection in the country's epidemic. There are about 170,000 PWID in the country. The testing for HIV among PWID started in the 1989 and was strengthened in 1996. In 2004 the cases of PWID was declining and the highest was in Kelantan about 44.7%. Mostly the PWID had test for HIV either in rehabilitation centre, prison, outpatient clinic or MMT service centre. The results indicate that most of PWID in Malaysia stay injecting for at least 15 years. There was also noted an increasing trend of young PWID shifting to non-injection drug use or mixed use of multiple drugs (Disease Control Division, 2015).

2.4.2 Heterosexual

A study was done in Trinidad showed that the reported case of HIV infection due to homosexual or bisexual was declining from 100% in 1983 to 24% to all cases in reported in 1993. The cases of heterosexual transmission of HIV was increasing around 48% up to December 1993. Otherwise, blood transfusion and vertical transmission were only 0.3% and 6.7% reported at that period of time. (Gourville *et al.*, 1998)

In Africa, heterosexual plays a major role in HIV transmission than by homosexual or injecting drug use in. Otherwise in the United States, 4% of the cases reported of HIV-positive were from heterosexual activities. It makes sense that over 100,000 persons infected with AIDS, 5% were gained from heterosexual transmission. Other study also similar to this, example, in the epidemic years in Brazil from 1982 to 1985, an overwhelming majority of AIDS cases were highly educated men. In 1988, more cases of AIDS have been reported among women, persons with less education. (Sevgi. A. 1993)

2.4.3 Psychosocial or knowledge factors

Young people's knowledge regarding HIV still has not improved. The Integrated Bio-Behavioural Survey (IBBS) in 2014 revealed that only 40.8% of young people age between 15-24 years old could tell correctly the ways of preventing sexual transmission of HIV and reject misconceptions about HIV transmission (Disease Control Division, 2015).

Some studies reported that low knowledge of HIV was one of the factor that contribute to pregnancy among antenatal mothers who was HIV-positive (Bah'him *et al.*, 2010). It was also said that low knowledge among women was due to low socio-economic status that may increase the risk of obtaining HIV infection. In Africa, a study also supports the similar finding that lack of knowledge of HIV prevention information may associate with the increasing risk of HIV infection. It mentioned

that the incorrect use of condom described the level of knowledge of society (Businge *et al.*, 2016).

A study in rural Nigeria stated that high level of education or knowledge increases the risk of HIV infection (Etukumana *et al.*, 2010). Among 205 women, 67.3% of them discussed with someone on HIV transmission. The discussion usually with their husband, health provider and close friends. In view of that, husband and health providers must play a role in having good knowledge regarding HIV to promote good practice (Ezat *et al.*, 2012). A study in Russia showed that high level of education was a protective factor against drug use and active sex activities during pregnancy (Girchenko *et al.*, 2015).

Otherwise in Tanzania, a study showed that there is no evidence that knowledge is related to HIV infection (Gourlay *et al.*, 2015). Knowledge of HIV is a major issue as women who knew they are HIV-positive, still became pregnant. Psychosocial issues like mental health and homelessness are also associated with the increase in HIV infection and these groups should be targeted (Hutchinson and Jameson, 2006).

However, in Sabah, reported that low knowledge, attitude and practice of HIV are related to HIV infection. While another study done at antenatal clinic in Malaysia mentioned that high knowledge of HIV transmission is significantly associated with high level of education (Koh, 2014).

Many women were familiar with the words AIDS, but very poor regarding knowledge about HIV (Mahmud and Abbas, 2009). There's also a study in South Africa said that knowledge of HIV infection were associated with having a husband with HIV-positive or unknown status. The study found out that knowledge of HIV was not related to HIV risk behaviour (Peltzer and Mlambo, 2013).

Another study in South Africa showed that psychological factors are one of the factors of HIV infection. The findings revealed that individuals with low self-esteem and self-efficacy tends to do unsafe sex (Johnson and Budlender, 2002).

2.5 Prevention Behaviour

A report from Barbados mentioned that prevention behaviour clearly a major factor in spreading HIV infection in the community (Hutchinson and Jameson, 2006). Testing for HIV in Malaysia was started in 1985. The test is free in all government health facilities, and can be accessed in all major health clinic and hospital, private hospital included. The Ministry of Health offers voluntary and confidential HIV testing (VCT) and Provider Initiated Testing and Counselling (PITC). All donated blood, blood products and organ, opt-out antenatal screening, testing of inmates in drug rehab centre and prison, testing TB and STI patients, clients of harm reduction program, contact of HIV, and voluntary premarital screening are part of the testing and screening program in Malaysia. In 2014 up to 490,000 pregnant women were tested and 324 individuals, 0.06%, were detected with to have HIV infection in prevention of mother-to-child-transmission (PMTCT) program (Disease Control Division, 2015).

A study had mentioned that levels of knowledge regarding HIV are lower in rural areas compared to urban areas and knowledge tends to be high in in employed groups rather than unemployed (Johnson and Budlender, 2002).

2.6 Conceptual Framework

Figure 2.1 showed conceptual framework of factors associated with newly diagnosed HIV among antenatal mothers. There are lots of factors that associated with newly diagnosed HIV among antenatal mothers based on literature review. Since our study based on secondary data, so only ten variables are available which are age, ethnicity, religion and occupation (mothers sociodemographic), number of heterosexual and number of PWID (mothers risk behavior), number of gravida and number of parity (obstetric history) and number of heterosexual and number of PWID (husband risk behavior).

Those mark with * were factors included in this study. The aim of this study to identify factors associated with newly diagnosed HIV among antenatal mothers in PMTCT program in Kelantan.